

Oil Well Records in McKean and Elk Counties, Pennsylvania.

BY CHAS. A. ASHBURNER, M.S. ASSISTANT GEOLOGICAL SURVEY.

(Read before the American Philosophical Society, August 16, 1878).

The demand for accurate well records in the northern oil field has become very great, from the eagerness with which the producers have sought to find petroleum, outside of the limits of the Bradford development. Most of the explorers, from the way in which their wells are drilled by contractors, are unable to keep a complete and correct record of the rocks through which the drill passes, yet they are ever anxious to procure reliable records from other sources to aid them in their "wild cat" operations.

During the past two years I have been able to obtain through the assistance of Mr. M. M. Schultz of Wilcox, a number of extremely valuable and interesting records of wells drilled in the vicinity of that village. Mr. Schultz by his untiring perseverance has succeeded in getting records of no less than six wells drilled to an average depth of over eighteen hundred feet. All have been kept with the greatest care and most of them under his personal supervision.

No complete register of all the rocks passed through by the drill has ever been kept by any of the producers in the Bradford oil field. In December, 1877, Prof. Lesley appointed Mr. Arthur Hale, of the Survey, to the special work of obtaining a correct record of the Dennis & Co.'s Well, No. 1, which was about to be drilled on the high summit to the south-west of Bradford.

All of these records together with a more minute description and fuller discussion of the rocks drilled through, will be found in my forthcoming report of progress in McKean and Elk Counties. I have been induced to communicate to the Society a few of the more valuable well records for immediate reference prior to the publication of the report.

The position of the Olean Conglomerate above the mouth of each well is given in feet in order that a comparison may be made between the several sections. All the rocks of the section are not named for reasons which can be better appreciated when the report is published.

The Olean Conglomerate is the bottom of the Coal Conglomerate No. XII, or Millstone grit. The Bradford oil producing sand belongs without question to the Chemung Period, or the upper part of No. VIII.

C. W. Dennis & Co.'s Well, No. 1.

Owned by C. W. Dennis & Co., situated on the Roger's farm, three-fourths of a mile south 35° west of Bradford, Bradford Township, McKean County.

The record of this well was kept by Mr. Arthur Hale, aid to Mr. John F. Carll, Assistant Second Geological Survey of Pennsylvania.

The well was drilled in December 1877, and January 1878. Mr. Hale made the measurements with great accuracy, the method pursued, to-

gether with a fuller description of the facts obtained, will be published in the District report.

It is due Mr. Hale to state that the Dennis record is, without doubt, the longest *detailed and accurately measured* record of any oil well in the United States. Deeper wells have been drilled, but no record has ever been kept so accurate as this one to such a depth. Wherever the rock passed through by the drill was found to change a specimen was secured; in many cases a number of specimens of the same stratum were kept, in order that after a more careful study the horizons or divisions might be shifted the better to agree with the true succession of the strata.

I hope to deposit a duplicate series of specimens in the museum of the Philadelphia Academy of Natural Sciences, and it is hoped that duplicates may be deposited in other museums throughout the States. In view of this fact, I have given below the numbers of the specimens obtained of each stratum. The elevation of the top of the well above Ocean in feet is 2055. The elevation of the Bradford Station of the Bradford Branch of the Erie Railway being 1444 feet

Surface clays.....	4'	to	4'
Sandy shale, olive-gray, micaceous, muddy; spec. 1.....	11	"	15
S. S. gray, fine, micaceous, muddy; specs. 2, 3, 4, 5.....	23	"	48
Shale dark-gray, with thin micaceous sand shells, muddy; specs. 6, 7.....	19	"	67
S. S. gray, fine, soft, muddy; spec. 8.....	8	"	75
Slaty sandstone, bluish, fine, muddy; specs. 9, 10.....	23	"	98
Fine gray sand-shells and dark slates alternating, muddy; specs. 11, 12, 13.....	18	"	116
S. S. ashy gray, very fine micaceous, muddy; specs. 14, 15....	16	"	132
Red shale, soft; spec. 16.....	6	"	138
S. S. olive gray fine micaceous; spec. 17.....	12	"	150
S. S. dark olive gray, fine micaceous; specs. 18, 19, 20.....	30	"	180
S. S. white, mixed with green and brown, fine; spec. 21.....	8	"	188
S. S. bluish gray, fine, micaceous, muddy; spec. 22.....	9	"	197
Red shale, "paint rock" top soft, bottom sandy and micaceous; specs. 23, 24, 25.....	18	"	215
S. S. gray, fine, mixed with slate, a few pebbles; specs. 26, 27..	23	"	238
Slate, bluish; specs. 28, 29, 30, 31.....	22	"	260
Slate, bluish, with thin plates of fine sandstone; specs. 32, 33..	15	"	275
Sandy slate, dark gray, fine, micaceous; specs. 34, 35, 36.....	16	"	291
Slate, bluish; specs. 37, 38, 39.....	24	"	315
S. S. gray, fine, micaceous; spec. 40.....	5	"	320
Red slate, micaceous, muddy; spec. 41, 42.....	8	"	328
S. S. olive gray, soft, micaceous, some slate; specs. 43, 44, 45..	39	"	367
Red rock, mottled sandy shale, brown, green and gray; specs. 46, 47.....	15	"	382
Slate sandy, gray; spec. 48....	8	"	390
S. S. dark, very fine; specs. 49, 50.....	10	"	400

S. S. gray, very fine, hard, drillings like flour; specs. 51-56 inclusive.....	35 to 435
Slate, sandy micaceous; specs. 57 to 63 inclusive.....	38 " 473
S. S. dark-gray, very fine, micaceous, flaky; spec. 64.....	6 " 479
S. S. bluish-gray, fine, hard, remnants of fossils; spec. 65.....	6 " 485
Slate, sandy in streaks, micaceous, fossil bands; specs. 66-76 inclusive.....	95 " 580
Dark-gray, thin-bedded S.S., fine, micaceous, slate partings, fossils; specs. 77 to 89 inclusive.....	71 " 651
S. S. gray, fine, flaky, micaceous, fossils; specs. 90, 91, 92.....	23 " 674
Slate; specs. 93, 94.....	12 " 686
S. S. dark-gray, slate partings, fossils; specs. 95, 96, 97, 98....	26 " 712
Red rock, purplish, sandy, very fine, micaceous, fossils; specs. 99, 100.....	10 " 722
Sandy slate, dark, micaceous; specs. 101, 102, 103.....	20 " 742
S. S. fine, micaceous, alternating with slate and "chocolate" shale, fossils; specs. 104 to 113 inclusive.....	63 " 805
S. S. thin bedded, micaceous, slate partings, fossils; specs. 114 115.....	13 " 818
Slate, an occasional sand-shell with fossils; specs. 116 to 136 inclusive.....	125 " 943
S. S. brown and purplish, fine, hard, fossils; spec. 137.....	8 " 951
Slate, dark lead color.....	55 " 1006
"Red Rock," fine, purple and gray sandy slate; specs. 147, 148.	14 " 1020
Gray sand, shells and slate, fossils; specs. 149 to 153 inclusive..	24 " 1044
Slate; specs. 154, 155.....	12 " 1056
S. S. dark, hard, fine; spec. 156.....	3 " 1059
S. S. yellow-gray, drillings as fine as flour; specs. 157 to 163 inclusive.....	13 " 1072
Slate; specs. 164, 165.....	5 " 1077
S. S. yellow-gray, fine; spec. 166.....	4 " 1081
Slate, sandy; specs. 167, 168, 169.....	7 " 1088
S. S. dark-gray, fine, fossils; specs. 170, 171.....	6 " 1094
Slate; specs. 172 to 175 inclusive.....	17 " 1111
S. S. brown and gray, fine, soft with some slate (oil show); specs. 176 to 180 inclusive.....	14 " 1125
Slate; specs. 181 to 186 inclusive.....	23 " 1148
Slate, with dark sand shells; specs. 187 to 190 inclusive.....	15 " 1163
Slate; specs. 191, 192.....	13 " 1176
Slate, with gray sand shells; specs. 193, 194.....	5 " 1181
Slate; specs. 195, 196, 197.....	12 " 1193
Slate, with an occasional sand shell; specs. 198 to 206 inclusive.	44 " 1237
Slate, "blue slate"; specs. 207 to 219 inclusive.....	63 " 1300
S. S. brown, fine, flaky, slate partings, fossils; specs. 220 to 223 inclusive.....	17 " 1317
Slate; specs. 224 to 229 inclusive.....	28 " 1345

S. S. dark-gray, fine, close, hard; specs. 230, 231.....	6 to 1351
S. S. brownish-gray, fine, slate partings; specs. 232 to 237 inclusive.....	30 " 1381
Sand, shells and slate; specs. 238 to 242 inclusive.....	22 " 1403
Slate, sand shell at 1428'; specs. 243 to 254 inclusive.....	59 " 1462
Fine sand shells and slate alternating; specs. 255 to 261 inclusive.....	25 " 1487
Slate, sand shells at 1510', 1531', and 1573'; specs. 262 to 286 inclusive.....	118 " 1605
Slate, with sand shells; specs. 287 to 291 inclusive.....	27 " 1632
Slate; specs. 292 to 295 inclusive.....	32 " 1664
S. S. brown, fine, flaky. Bradford "3d" or oil producing sand; specs. 296 to 310 inclusive.....	54 " 1718
Slate and S. S.; spec. 311.....	1 " 1719

The top of the ridge directly above the Dennis Well, No. 1, is capped by the Sub-Olean Conglomerate, which lies from 50 to 70 feet below the bottom of the Olean Conglomerate; the top of the well is about 115 feet below this latter horizon.

The sandstone and conglomerate which caps the summits surrounding Bradford, and which is found broken up in large masses on the hill slopes, comes from the Olean Conglomerate.

Kinzua Well or "Dry Hole," P. C. L. and P. Co.

Owned by the Producers Consolidated Land and Petroleum Company of Bradford, situated on Kinzua Creek, near the mouth of Glad run, in warrant 3122, Hamlin Township, McKean County, and about five miles north-east of Kane. The land upon which this well is located together with the adjoining tracts are part of those originally belonging to the "McKean and Elk Land and Improvement Co.," General Thomas L. Kane, Supt.

The well was drilled in the Spring of 1877, and the record was furnished by Mr. L. C. Blakeslee, Superintendent P. C. L. and P. Co.

The elevation of the top of the well, as determined by Mr. J. W. Murphy of Wilcox, is 52 feet higher than Wilcox Well, No. 3, or 1718 feet above Ocean.

Surface clays, &c.....	32 to 32
Soft slate.....	78 " 110
Mud slate.....	95 " 205
Red rock.....	50 " 255
Slate rock.....	38 " 293
Red rock.....	57 " 350
Sand "shells" and red rock mixed.....	15 " 365
Slate.....	35 " 400
Sand "shell".....	10 " 410
Slate.....	346 " 756
Mixed slate and hard slate rock.....	361 " 1017
Mixed slate and sand "shells".....	358 " 1375

Hard slate mixed with sand and "pebble shell".....	370 to 1745
Slate and sand alternating	40 " 1785
Drilled dry. Cased at.....	370'
Heavy sand "shell" at.....	1017'
Sand at.....	1745'
Slate "	1760'
Sand "	1768'
Slate "	1780'
Salt water found in sands at.	1745' and 1768'

Mr. Blakeslee reports that no "good show" of oil was found. A small gas vein was struck, position not stated. Elevation of the bottom of the Olean Conglomerate on the P. & E. R. R. four miles due south-west from the Kinzua Well is 1868 feet. The calculated elevation of the same horizon at the well is 1900 feet.

Wilcox Well, No. 2, or Schultz Gas Well.

Owned by M. M. Schultz & Co., situated on the west branch Clarion River, in warrant 2676, Sergeant Township, McKean County, and five miles north of Wilcox, a station on the Philadelphia and Erie Railroad, 104 miles east of the City of Erie. This well is 855 feet south, 17 degrees 30 minutes west, of Wilcox Well, No. 1, or the old Adams Well,* which was drilled in 1864. (?)

Drilling on this well was commenced about the first of the year (1876) and completed in the latter part of August of the same year. After the drilling was completed to a depth of 2004 feet, an "oil saver" was attached to the iron casing ($5\frac{3}{4}$ inch), and the gas issuing from the well was conveyed through a two inch pipe and discharged about two feet above the surface of the water, which partially filled the 250 barrel tank which had been erected. Sufficient oil was passed to show itself as a scum on the surface of the water.

Mr. Schultz conceived the idea of inserting into the well to a depth of 2000 feet, an inch pipe, and by closing the mouth of the casing to utilize the pressure of the gas to force the oil out through the inch tubing.

Mr. Schultz believed that the bulk of the oil which was found in the well was coming from the sand extending from 1795 to 1815 feet, in which the drillers reported that they had "struck" a small quantity of heavy green oil. In this event the immense volume of gas which was issuing from a depth of 1776 feet might more than counterbalance in its pressure the pressure of the oil from a lower horizon, and thus prevent it from filling the hole.

After the tubing was adjusted and the gas confined in the well as much

* For a complete record of this well, see a paper by Prof. Lesley in the Proceedings of the American Philosophical Society, Vol. X, page 238; also one in the Petroleum Monthly of a later date. A description of a very interesting action of this well is given in a paper named "Description of the Wilcox Spouting Water Well," which I read before the Society, Sept. 21, 1877.

as two to three barrels were forced out. Mr. Schultz thinks that the tubing during this time must have been entirely filled with oil to the exclusion of gas. In this case the pressure of the gas must have been sufficient to raise a column of oil one square inch in section and 2000 feet high. Of course, such an enormous pressure could only be temporary. The oil flowed from the tubing but for a few moments, the gas then probably became thoroughly mixed up with the oil which from its low temperature quickly congealed and effectually choked the pipe. After a few hours the gas ceased to flow entirely from the well and also from the adjoining well, No. 1. The gas commenced to flow again with greater energy after 36 hours of inactivity, from both wells, Nos. 1 and 2.

In the early part of 1877, the pressure of the gas seemed to increase suddenly. About the middle of May, four months after, the gas from both wells, Nos. 1 and 2, ceased to flow for the second time without any obstruction having been knowingly placed in its way. No gas was found to come from either well till July 14th, when it commenced to flow again. Up to the present time the amount of gas increases and diminishes at irregular intervals. The gas from this well was used as fuel in drilling well, No. 3.

The elevation of Wilcox Well, No. 2, is 1642 feet above Ocean on the corrected datum of the P. & E. R. R. which makes Wilcox Station 1527.*

Loam and gravel.....	30 to	30
Gray slate.....	50 "	80
Gray slate.....	2½ "	82½
Gray sand.....	42½ "	125
Red shale.....	20 "	145
Gray sand.....	5 "	150
Red shale.....	25 "	175
Gray soapstone (shale and clay).....	10 "	185
Red shale mixed with gray slate.....	155 "	340
Streak of soft red shale.....	15 "	355
Gray slate.....	62 "	417
White sand pebble rock containing gas and salt water.....	5 "	422
Gray slate.....	228 "	650
Dark gray slate.....	30 "	680
Gray slate and sand.....	75 "	755
Gray and red slate mixed.....	40 "	795
Gray slate.....	60 "	855
Gray slate and hard shell.....	5 "	860
Gray slate.....	5 "	865
Gray and red slate.....	20 "	885
Gray slate.....	25 "	910
Red and gray slate.....	5 "	915
Gray slate.....	30 "	945
Gray sand.....	5 "	950
Gray and red sand.....	5 "	955

* Report N. Second Geological Survey of Pennsylvania, p. 112.

Gray and red slate.....	15 to	970
Gray slate.....	15 "	985
Gray slate and sand.....	5 "	990
Gray slate.....	60 "	1050
Gray slate and sand.....	5 "	1055
Gray slate and sand.....	25 "	1080
Dark gray sand.....	15 "	1095
Very hard light gray sand.....	5 "	1100
Gray slate and sand containing small bivalve shells.....	20 "	1120
Gray slate and hard gray sand.....	5 "	1125
Gray slate and soft sand.....	10 "	1135
Hard gray sand.....	10 "	1145
Soft gray slate.....	27 "	1172
Gray sand.....	8 "	1180
Gray sand and slate.....	5 "	1185
Gray slate containing shells.....	15 "	1200
Gray sand containing first strong smell of oil 1205 to 1210....	20 "	1220
Gray slate and hard shell.....	15 "	1235
Gray slate.....	15 "	1250
Gray slate containing shells.....	15 "	1265
Gray slate and clover seed sand.....	5 "	1270
Gray slate with hard shell.....	10 "	1280
Gray slate.....	10 "	1290
Gray slate and hard shell.....	25 "	1315
Light gray sand.....	10 "	1325
Coarse gray sand.....	5 "	1330
Slate.....	5 "	1335
Hard gray sand.....	5 "	1340
White sand.....	10 "	1350
Coarse gray sand.....	5 "	1355
Gray slate and shell.....	5 "	1360
Gray slate.....	30 "	1390
Gray sand.....	10 "	1400
Gray slate.....	20 "	1420
Gray slate containing shell.....	25 "	1445
Gray slate.....	15 "	1460
Gray slate containing shell.....	105 "	1565
Hard gray sand.....	15 "	1580
Slate and shell.....	55 "	1635
Gray sand.....	35 "	1670
Coarse gray slate.....	9 "	1679
Dark brown sand containing amber oil, greatest amount near top of sand.*.....	16 "	1695
Gray slate.....	40 "	1735
Gray slate and sand.....	10 "	1745

* Probable representative of Bradford "3d" or oil producing sand.

Gray slate and shell.....	25 to 1770
Gray slate and sand.....	6 " 1776
Hard gray sand rock containing a great quantity of gas.....	4 " 1780
Gray slate.....	10 " 1790
Fine sand and slate.....	5 " 1795
Gray sand, upper part containing heavy green oil.....	20 " 1815
Gray and red micaceous sand and pebbles.....	20 " 1835
Gray slate.....	55 " 1890
Gray slate and red sand.....	5 " 1895
Red sand and pebbles.....	5 " 1900
White sand containing oil.....	10 " 1910
White and gray sand containing oil.....	20 " 1930
Gray slate.....	74 " 2004

Drilled Dry. Cased.....	541'
Fresh water course.....	42½'
Gas and salt water.....	422'
Gas increases, salt water.....	538'
Gas vein.....	1172'
First show of oil.....	1205' to 1210'
Sand containing greatest amount of oil, particularly at top of sand. Oil, amber color.....	1679' to 1695'
Great gas vein.....	1776'
Heavy green oil.....	1800'
White and gray sand containing oil.....	1900' to 1930'

Wilcox Well, No. 3, or "John's Well,"

Owned by M. M. Schultz & Co., and situated 1782 feet north 73 degrees 30 minutes west of well No. 2.

The well was commenced in the early part of October, 1876, and completed to a depth of 1850 feet about the middle of June, 1877.

After the well had been drilled to a depth of 1720 feet, tubing was inserted to a depth of 1684 feet, and it was reported that the well produced, by pumping, a barrel a day for about six months, when it was decided to drill deeper. The tubing was drawn, and after losing the tools several times, drilling was finally abandoned at a depth of 1850 feet.

The elevation of the top of the well is 1666 feet above Ocean; Wilcox Station being 1527 feet above the same datum.

This well was tubed about the first of the year, and has since been pumped continuously every other day. Its average daily production is reported to be a barrel and a-half.

The Olean Conglomerate is not exposed in the vicinity of the Wilcox Wells, the lower horizon is probably 125 feet above the mouth of Wilcox Well, No. 2.

Drift, as follows :	43'	to	43'
Loam and sand	5'		
Loam and gravel	5'		
Gravel and pebble	10'		
Gravel and sand	5'		
Gravel and pebble	5'		
Gravel and sand rock	5'		
Quicksand and coarse pebble	5'		
Fine sand	3'		
Gray slate	2	to	45
Gray slate	35	"	80
Gray sand	37	"	117
Red slate or shale	18	"	135
Red shale (rock hard)	10	"	145
Gray sand rock	10	"	155
Red shale	5	"	160
Red slate	20	"	180
Gray slate	25	"	205
Red slate	105	"	310
Red shale	15	"	325
Gray slate and sand	15	"	340
Gray slate and shell	15	"	355
Red slate	25	"	380
Gray slate	1	"	395
Gray slate and shell	20	"	415
Gray sand	15	"	430
Gray slate	5	"	435
Gray sand rock	7	"	442
Clover seed rock	8	"	450
Gray shale	15	"	465
Dark gray slate and shell	75	"	540
Gray slate and shell	7	"	547
Gray slate	43	"	590
Hard gray slate	75	"	665
Hard dark gray shale	30	"	695
Gray slate and sand	5	"	700
Hard gray sand	15	"	715
Light sand with shale	5	"	720
White and gray sand	55	"	775
Hard and fine gray sand	25	"	800
Fine dark gray sand	5	"	805
Gray slate	5	"	810
Gray slate and shale	5	"	815
Fine gray sand	23	"	838
Red slate	7	"	845
Gray sand	25	"	870

Red slate.....	10 to 880
Gray slate.....	35 " 915
Red slate.....	5 " 920
Gray slate.....	15 " 935
Soft gray sand.....	5 " 940
Soft gray and white sand.....	15 " 955
Dark gray sand.....	5 " 960
Hard gray sand.....	5 " 965
Gray sand and slate.....	5 " 970
Fine hard dark gray sand.....	5 " 975
Red slate.....	5 " 980
Gray slate.....	35 " 1015
Hard gray sand.....	20 " 1035
Gray slate.....	35 " 1070
Dark gray sand.....	5 " 1075
Gray sand.....	5 " 1080
Gray shale.....	15 " 1095
Gray sand and very hard shells.....	5 " 1100
Soft gray sand.....	15 " 1115
Gray and white shell.....	10 " 1125
Close soft white sand.....	20 " 1145
Hard gray shells.....	20 " 1165
Gray slate.....	15 " 1180
White and gray sand and pebbles.....	10 " 1190
Close white sand.....	5 " 1195
Gray sandstone and white pebbles.....	20 " 1215
Coarse white sand.....	5 " 1220
Silver gray sand.....	10 " 1230
Fine white sand.....	5 " 1235
Gray slate and shell.....	10 " 1245
Gray slate.....	40 " 1285
Gray slate and shell.....	25 " 1310
Gray sand.....	20 " 1330
White sand.....	10 " 1340
Slate.....	5 " 1345
Coarse gray sand.....	10 " 1355
Soft white sand.....	5 " 1360
Soft gray sand.....	5 " 1365
Fine white sand.....	5 " 1370
Slate and hard shell.....	15 " 1385
Gray hard shell.....	30 " 1415
Gray slate.....	20 " 1435
Slate and shell.....	5 " 1440
Hard gray sandstone.....	10 " 1450
White sand.....	5 " 1455
Gray slate.....	35 " 1490

Hard gray shale.....	5 to 1495
Gray sand.....	5 " 1500
Close white sand.....	5 " 1505
Hard white sand.....	5 " 1510
Gray slate.....	20 " 1530
Gray slate and shell.....	5 " 1535
Hard white sand.....	10 " 1545
Gray shell.....	5 " 1550
Gray slate.....	25 " 1575
Gray sand and shell.....	15 " 1590
Gray slate.....	15 " 1605
Gray sand.....	20 " 1625
Gray slate.....	10 " 1635
Gray slate and shell.....	30 " 1665
Gray slate.....	10 " 1675
Gray slate and shell.....	10 " 1685
Crevice full of quicksand.....	2 " 1687
Dark sand containing oil.....	3 " 1690
Crevice, containing loose stones, and oil.....	5 " 1695
Dark sand and oil.....	5 " 1700
Coarse sand and oil.....	5 " 1705
Loose slate.....	10 " 1715
Light colored slate.....	65 " 1780
"Gas crevice" full of stone and sand.....	5 " 1785
Dark sand.....	7 " 1792
Light colored slate.....	16 " 1808
Hard fine sand.....	15 " 1823
White and red sand mixed, red sand like quicksand.....	9 " 1832
Fine red and white sand.....	11 " 1843
Sandy slate [?].....	7 " 1850
Drilled dry. Cased.....	547'
Drive pipe.....	43'
Heavy water course.....	52½'
Gas vein.....	593'
First strong smell of oil.....	1132'
Gas and strong smell of oil.....	1182'
Oil in gray shale.....	1685'
Crevice full of quicksand.....	1687'±
Oil.....	1690'
Crevice containing loose stones and oil.....	1695'
Oil.....	1700'
Oil.....	1705'
Pumped.....	1720' (?)
Oil.....	1780'
Gas crevice full of stone and sand.....	1784'
Gas crevice.....	1808'

The bottom of the Olean Conglomerate is the same distance above well

No. 3 as well No. 2, allowing for the difference in elevation of the two wells.

Ernhout and Taylor Well, No. 1.

Owned by Capt. John Ernhout and Frank Taylor, Esq., on north side of Wilson Run, near south-east corner of warrant 3218, Jones Township, Elk County, and about $3\frac{3}{4}$ miles north-west of Wilcox and several hundred feet north of the P. & E. R.R. The tract upon which this well is located is owned by D. Scull, Jr., Esq., of Philadelphia. Drilling was commenced Jan. 15, 1878, and abandoned March 13, when the tools were lost at a depth of 1335 feet. It is expected after the tools shall have been recovered, that the well will be drilled deeper.

Record reported by Mr. M. M. Schultz. Elevation of well, determined by Mr. A. W. Sheaffer, Aid, McKean District, 1645 feet (Bar).

Loam and sand.	40' to 40'
Blue sand shale.....	160 " 200
Blue slate.....	40 " 240
Red rock.....	95 " 335
Red rock, very hard.	15 " 350
Red rock, softer.....	45 " 395
Red rock.....	45 " 440
Sand and shells.....	15 " 455
Slate.....	15 " 470
Red rock.....	10 " 480
Red sand.....	15 " 495
Blue sand shells.....	35 " 530
Brown sand and white pebble.....	20 " 550
Slate and shells.....	95 " 645
Hard blue sand.....	10 " 655
Slate and shells.....	20 " 675
Brown sand and white shells..	5 " 680
Slate and shells.....	75 " 755
Blue sand.....	25 " 780
Slate and shells.....	210 " 990
Red rock.....	20 " 1010
Slate.....	50 " 1060
White sand.....	35 " 1095
Red sand.....	20 " 1115
Slate and shells.....	135 " 1250
Gray sand.....	25 " 1275
Gray slate and shells.....	10 " 1285
Gray sand.....	20 " 1305
Slate and shells.....	10 " 1315
White sand.....	5 " 1320
White sand containing gas and strong smell of oil.....	15 " 1335
Drilled dry. Cased.....	481½'
Gas and smell of oil.....	1320'
Lost tools.....	1335'

The position of the bottom of the Olean Conglomerate above the Ern-hout and Taylor Wells has not yet been determined.

A comparison may be made between these sections and the records of the Wilcox Wells by means of the red shale bands.

Ernhout and Taylor Well, No. 2.

Owned by Ernhout and Taylor, and situated in the south-eastern corner of warrant 3215, Wetmore Township, McKean County, about one mile north of well No. 1. Tract formerly part of McKean and Elk Land and Improvement Co.'s lands.

Drilling commenced March 12, 1878, mineral water "vein" struck at a depth of 1990 feet May 9. The well was afterwards drilled 10 feet deeper through a dark fine (coffee grounds) sand strongly impregnated with oil. Oil not having been found in this well in paying quantities the casing was drawn, and water from the fresh water "veins" permitted to flow into the hole. The gas threw out of the well water, at regular intervals, to a height of 125 feet, more or less.* Shortly after the casing was drawn, a wooden plug was inserted into the upper part of the well and partially filled the hole. After this was done the well spouted every eleven minutes, the eruption lasting for two minutes. The column of water and gas rises above the top of the derrick (70 feet), and after several pulsations falls and almost ceases to spout, when it suddenly rises again repeating the action, and vanishing entirely at the end of two minutes.

Record reported by Mr. M. M. Schultz. Elevation of well determined by Mr. Sheaffer, 1730 feet (Bar).

Loam and sand.....	40' to	40'
Gray slate.....	85 "	125
Shells.....	10 "	135
Gray slate.....	65 "	200
Gray slate and shells.....	105 "	305
Red shale.....	10 "	315
Sand and shells.....	40 "	355
Red shale.....	125 "	480
Shells.....	30 "	510
Red rock.....	50 "	560
Gray slate.....	30 "	590
Red shale.....	55 "	645
Gray slate.....	175 "	820
Hard sand shells.....	80 "	900
Sand shell.....	100 "	1000
Sand.....	75 "	1075
Red rock.....	5 "	1080
Red rock, "pale".....	5 "	1085
Gray slate.....	85 "	1170

* See paper which I read before the Society, Sept. 21, 1877, on the "Wilcox Spouting Water Well." The action in these two wells is similar.

Red rock.....	5 to 1175
Soft, muddy, gritty, slate.....	130 " 1305
Gray slate.....	80 " 1385
Light gray slate.....	10 " 1395
Sand shells.....	10 " 1405
Sand, smell of oil.....	10 " 1415
Sand containing heavy gas "vein.".....	2 " 1417
Sand.....	5 " 1422
Gray slate.....	48 " 1470
Sand and shells.....	85 " 1555
Dark and light gray slate.....	210 " 1765
Sandy slate.....	45 " 1810
Hard gray sand.....	5 " 1815
Slate.....	65 " 1880
Dark brown sand.....	10 " 1890
Soft gray slate.....	90 " 1980
Dark sand strongly impregnated with oil.....	10 " 1990
Dark fine sand (coffee grounds) containing oil.....	10 " 2000
Drilled dry. Cased.....	364'
Gas.....	1415'
Oil smell.....	1405'
Strong smell of oil.....	1890'
Strong smell of oil.....	1990'
Heavy "vein" of mineral water, easily corroding the tools.....	1990'

Bear Creek Well, or "Dry Hole," P. C. L. and P. Co.

Owned by the Producers' Consolidated Land and Petroleum Company, of Bradford. Situated on Bear Creek, east side of County road between Wilcox and Ridgway, in warrant 3257, Jones Township, Elk County. Land leased from Wilcox Tanning Company.

Drilling was commenced about April 1, 1878, and was completed in from 50 to 60 days.

The record was reported by Mr. M. M. Schultz. No show of oil was found.

The elevation of the top of the well is 1595 feet (Bar.) above ocean.

Drift.....	25' to 25'
Blue slate rock.....	25 " 50
Red rock.....	15 " 65
Blue slate.....	10 " 75
Red rock.....	20 " 95
Sandy or "putty" slate rock.....	25 " 120
Sand rock.....	25 " 145
Soft slate.....	12 " 157
Hard shells.....	5 " 162

Very muddy slate	20 to	182
Hard slate	10 "	192
Hard sand	8 "	200
Hard slate	30 "	230
Very white loose sand	35 "	265
Hard shells and slate	5 "	270
Very hard sand	20 "	290
Tough slate rock	10 "	300
Very hard shells	10 "	310
Hard fine sand	10 "	320
Soft slate	30 "	350
Hard fine sand	60 "	419
Soft slate	10 "	429
Hard fine sand	10 "	439
Shells	30 "	469
Very red rock	5 "	474
Soft slate or "putty" rock	80 "	554
Shells and slate	55 "	609
Blue slate	15 "	624
Red rock	10 "	634
Blue slate	22 "	656
Hard sand	9 "	665
Red rock	26 "	691
Blue slate	12 "	703
Hard shell	4 "	707
Red rock	86 "	793
Blue slate	22 "	815
Red rock	48 "	863
Slate and shells	30 "	893
Red rock	26 "	919
Hard gray sand	10 "	929
Soft slate and shell	167 "	1096
Gray slate	159 "	1257
Sand	10 "	1265
Slate and shells	30 "	1295
Fine red sand	10 "	1305
Slate and shells	203 "	1508
Sandy shells	25 "	1533
Slate and shells	34 "	1567
Close light sand	12 "	1579
Soft slate	25 "	1604
Close white sand	10 "	1614
Slate and shells	52 "	1666
Pebble sand	5 "	1671
Slate and shells	15 "	1686
White sand shells	10 "	1696

Hard slate.....	10 to 1706
Loose white sand.....	50 " 1756
Slate and shells.....	65 " 1821
Muddy slate.....	15 " 1836
Slate and shells.....	12 " 1848
Muddy slate.....	20 " 1868
Slate and sand shells.....	30 " 1898
Sand.....	22 " 1920
Slate and shells.....	8 " 1928
Slate.....	60 " 1988
Slate and shells.....	10 " 1998
Drilled dry. Cased.....	380'
Drive pipe.....	25'
Crevice drained off water.....	120'
" " " ".....	230'
Salt water.....	270'
Drillers reported "oil smell" in sand from 1706 to 1756'	

The Olean Conglomerate in this locality varies very much in its character. It is found changing from a coarse pebble conglomerate to a rather fine or even shaly sandstone in comparatively short distances. The "blue slate rock" directly under the drift in the Bear Creek well, represents probably a portion of the Olean Conglomerate.

Silver Creek Well or "Dry Hole." Burton and Wallace.

Owned by Messrs. Burton and Wallace, of Rynd Farm, situated on Silver Creek, west side of County road, between Wilcox and Ridgway, in warrant 3261, Ridgway Township, Elk County. Land leased from Wilcox Tanning Company.

Drilling was commenced about the same time as at the Bear Creek Well, and was completed June 26, 1878.

The record was reported by Mr. M. M. Schultz. No show of oil was found.

The elevation of the top of the well is 1615 feet (Bar.) above ocean.

Conductor.....	15' to 15'
Slate.....	15 " 30
Gray sand.....	25 " 55
Pebble sand.....	30 " 85
Red slate.....	5 " 90
Black sand.....	60 " 150
Fine blue sand.....	70 " 220
Red slate.....	10 " 230
Fine pebble rock.....	30 " 260
Dark fine sand.....	40 " 300
Slate and hard shells.....	10 " 310
Fine blue sand.....	70 " 380

White slate.....	10 to	390
Hard fine sand.....	55 "	445
White slate and hard shells.....	95 "	540
Red rock.....	5 "	545
Soft white slate.....	55 "	600
Hard shells and slate.....	10 "	610
Soft white rock.....	40 "	650
Red rock.....	100 "	750
White slate.....	15 "	765
Red rock.....	85 "	850
White slate.....	22 "	872
Red rock.....	25 "	897
White shells and slate.....	26 "	923
Red rock.....	40 "	963
White slate.....	42 "	1005
Hard shells and slate.....	20 "	1025
White slate with shells.....	50 "	1075
Hard black sand.....	25 "	1100
Hard slate.....	75 "	1175
Black slate and shells.....	45 "	1220
Hard white sand.....	15 "	1235
Slate.....	10 "	1245
Sand and shells.....	10 "	1255
Hard shelly rock.....	45 "	1300
Pale red rock and slate.....	10 "	1310
White slate and shells.....	10 "	1320
Red sand.....	12 "	1332
Soft slate.....	13 "	1345
Hard shells.....	20 "	1365
Light red sand.....	10 "	1375
Hard shelly rock.....	20 "	1395
Fine gray sand.....	10 "	1405
Hard red rock.....	10 "	1415
Slate and shells.....	20 "	1435
Red sand and pebbles.....	25 "	1460
Hard shells.....	15 "	1475
Slate and shells.....	35 "	1510
White slate.....	10 "	1520
Gray sand.....	8 "	1528
Red rock.....	7 "	1535
Slate and hard shells.....	45 "	1580
Hard fine white sand.....	25 "	1605
Hard slate and shells.....	20 "	1625
Fine white sand.....	8 "	1633
Hard shells.....	7 "	1640
Fine gray sand.....	10 "	1650

Hard shells and slate	15 to 1665
Hard shells.....	5 “ 1670
Sand and pebbles.....	8 “ 1678
Slate and shells.....	82 “ 1760
Drilled dry. Cased	450'
Conductor.....	15'
Salt water in slate.....	445 to 540'
“ “ red rock.....	1528 to 1535'
Smell of oil reported in sand.....	1670 to 1678'

The Olean Conglomerate is probably represented in the record by the sand from 30 to 85 feet below the top of the well.

The records of the Bear Creek and Silver Creek Wells are invaluable as having a direct bearing upon the probable existence of petroleum to the south and south-east of Wilcox.

It will be noticed that the mass of the red rocks are some 300 feet lower in the the Bear and Silver Creek Wells than in the Wilcox Wells, estimating from the bottom of the Olean Conglomerate.

The question as to whether the mass of red bands in the two localities are the same and whether the strata included between them and the Olean have thickened to the south and south-east, is extremely suggestive.

NOTE.—The records are published just as they have been reported to me. I have not even altered the phraseology, which is quite different in a number of places where the same idea was evidently intended to be conveyed.

I will merely add, for those who are unacquainted with the terms employed by the drillers, that “shell” means any hard stratum encountered in the well, and not, as might be supposed, a fossil.

Nature's Reforesting. By Eii K. Price.

(Read before the American Philosophical Society, September 20, 1878.)

The paper on *Sylviculture* read in November and December, 1877, has produced the following confirmatory letters of views therein expressed. They are from the present Chief Justice of Pennsylvania, who lives in Beaver, and the Professor of Botany in the University of Pennsylvania, formerly a resident of Mifflin County, Pennsylvania.

CONTINENTAL HOTEL, FEBRUARY 11, 1878.

MY DEAR SIR:—I have read the address you sent me on *Sylviculture* with great interest, especially as some of its facts have come under my own observation. The western part of Pennsylvania was once among the best wooded portions of it, yet the destruction of timber has plainly affected